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| 10/090,871 | 03/05/2002 | Rajiv Laroia | 060533 | 7954 |
| 23696 | 7590 | 05/07/2008 | | |
| QUALCOMM INCORPORATED | | | EXAMINER | |
| 5775 MOREHOUSE DR. | | | ROSE, KERRI M | |
| SAN DIEGO, CA 92121 | | | ART UNIT | PAPER NUMBER |
| | | | 2616 | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/090,871 | LAROIA ET AL. | |
| | Examiner | Art Unit | |
| | KERRI M. ROSE | 2616 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 27 February 2008.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 26-66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 26-66 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ . | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 26-66 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 26-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren et al. (EP 0933897; provided by applicant) in view of Spruyt et al. (EP 0820171; provided by applicant) and further in view of Kim et al. (US 7,110,387).

4. In regards to claim 26, Dagdeviren discloses a method of making symbol timing adjustments in a communications device including a transmitter which transmits multiple symbols, the method comprising the step of: determining the length by which the symbol timing is to be delayed (paragraph 24 lines 34 and 35 disclose delaying the symbol timing by increasing the size of the cyclic extension.); increasing the number of samples in one of a first symbol and a last symbol by the determined number of samples when said symbol timing is to be delayed (p. 24 lines 34-35 disclose delaying; figs. 8 and 9 disclose the addition may be made at either the beginning or the end of the symbol.) Due to the alternative nature of the claim (advanced *or* delayed only the portion referring to delay needs to be addressed. Dagdeviren does not disclose

the length of the symbol delay is equal to a number of samples. Dagdeviren also does not disclose wherein the symbol to be delayed in one of a plurality of symbols making up a dwell.

Spruyt discloses adding samples (not symbols) in column 2 lines 28-31. Kim discloses timing alignment by adding samples to the first symbol in a dwell in figure 5. (The dwell is referred to as a data symbol, but it is composed of 4 data symbols, each of which is composed of N samples, therefore satisfying the definition of a dwell.)

It would have been obvious to one of ordinary skill in the art at the time of the invention to align the symbols of Dadeviren's system by duplicating samples, as taught by Spruyt because doing so aligns the boundaries of the received and transmitted symbols, as taught by Spruyt in column 2 lines 28-31 and reduces the complexity of echo cancellation, as taught in column 2 lines 18 and 19.

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the timing alignment of Dagdeviren and Spruyt on one symbol in a dwell as opposed to every symbol in a dwell, as taught by Kim, because doing so reduces receiver complexity and allows for faster synchronization because the receiver does not need to search for the start position of each data symbol, as taught by Kim in column 2 line 59 – column 3 line 2 and column 4 lines 14-36.

5. In regards to claim 27, Dagdeviren, Spruyt, and Kim disclose the method of claim 26, wherein the number of samples in the remaining symbols in the dwell which includes said one of the first and the last symbol of said dwell to which samples were added or removed to adjust symbol timing do not have their number of symbols changed as part of making symbol timing

adjustments (Dagdeviren figs. 8 and 9 disclose only the cyclic prefix portions of the first or last symbol are changed; Kim fig. 5 discloses only the pilot symbol is modified.).

6. In regards to claim 28, Dagdeviren, Spruyt, and Kim disclose the method of claim 26, wherein said one of said first symbol and a last symbol of said dwell is said first symbol, the first symbol including a cyclic prefix portion and a body portion; and wherein increasing the number of samples in said first symbol includes: copying samples from the body portion of said first symbol and inserting the copied samples at the start of said first symbol thereby increasing the number of samples in said first symbol. Spruyt discloses duplicating samples of the body portion in column 2 lines 28-29. Dagdeviren discloses that the changes are made only to the cyclic extension, i.e. the duplicated portion is added to the cyclic extension only, in page 5 lines 34-35.

7. In regards to claim 29, Dagdeviren, Spruyt, and Kim disclose the method of claim 26, wherein said one of a first symbol and a last symbol of said dwell is said first symbol, the first symbol including a cyclic prefix portion and a body portion; and wherein decreasing the number of samples in said first symbol includes: removing samples from the start of the cyclic prefix portion thereby decreasing the number of samples in said first symbol. Spruyt discloses deleting samples in column 2 lines 28-29. Dagdeviren discloses that the changes are made only to the cyclic extension, i.e. the deleted portion is taken from the cyclic extension only, in paragraph 24 lines 34-35. 20.

8. Claims 30 and 31 are rejected upon the same basis as claims 28-29. Claims 30-31 recited the same limitations as claims 28-29 but the changes are made to the last symbol instead of the first symbol. Dagdeviren discloses that the cyclic extension portion is really just one total value

that is illustrated as occurring at the first and last symbol of each dwell in page 5 lines 5-8, therefore the designation of first and last symbol has no meaning. 21.

9. Claims 32-36 are rejected upon the same basis as claims 26 and 28-31. Dagdeviren figure 14, Spruyt figure 1, and Kim figure 4 disclose devices that can perform the method steps of claims 26 and 28-31.

10. Claims 37-41 and 43-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knutson et al. (US 6,563,862; previously cited) in view of Dagdeviren et al. (EP 0933897) further in view of Kim et al. (US 7,110,387).

11. In regards to claim 37, Knutson discloses a method for adjusting symbol timing in a first communications device in a Orthogonal Frequency Division Multiplexing system, the method comprising: determining a receiver symbol timing adjustment to be made to adjust receiver symbol timing in said first communications device to synchronize receiver symbol timing to the symbol timing of a second communications device; and adjusting the symbol timing of a transmitter in said first communications device as a function of said determined receiver symbol timing adjustment (see claim 21 rejection). Knutson does not disclose said step of adjusting the symbol timing of the transmitter including selecting one of a first and a last symbol in a dwell to be modified to adjust the transmitter symbol timing, said dwell being a period of time comprising multiple symbol tones prior to switching to another tone or set of tones.

Dagdevrin paragraph 24 lines 34-35 discloses that a number of samples are added to the cyclic extension in order to delay and maintain synchronization. Kim discloses timing alignment by adding samples to the first symbol in a dwell in figure 5. (The dwell is referred to as a data

symbol, but it is composed of 4 data symbols, each of which is composed of N samples, therefore satisfying the definition of a dwell.)

It would have been obvious to one of ordinary skill in the art at the time of the invention to increase the size of the cyclic prefix, as taught by Dagdeviren, in the symbol adjustment scheme of Knutson because doing so helps account for propagation delay, as taught by Dagdeviren in paragraph 8.

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the timing alignment of Knutson and Dagdeviren on one symbol in a dwell as opposed to every symbol in a dwell, as taught by Kim, because doing so reduces receiver complexity and allows for faster synchronization because the receiver does not need to search for the start position of each data symbol, as taught by Kim in column 2 line 59 – column 3 line 2 and column 4 lines 14-36.

12. In regards to claim 38, Knutson and Dagdeviren disclose the method of claim 37, wherein said receiver symbol timing adjustment indicates that symbol timing should be adjusted by an amount corresponding to D digital signal samples. Knutson discloses adjusting by D samples in column 8 lines 1-6.

13. In regards to claim 39, Knutson discloses the method of claim 37, wherein the signal received from said first base station is a timing control signal used to control the receiver circuit to make a symbol timing correction. Column 7 lines 49-53 disclose that a signal is received at the handset from the base station. The signal is used for timing correction, which means the signal can be thought of as a timing control signal. Additionally, Kim discloses sending a timing control signal from a timing compensator in fig. 4 element 151.

14. In regards to claim 40, Knutson, Dagdeviren, and Kim disclose the method of claim 38, wherein the first communication device is a wireless terminal (104, 106). Knutson discloses in figure 1 a base station with a plurality of wireless terminals.

15. In regards to claim 41, Knutson, Dagdeviren, and Kim disclose the method of claim 40, wherein the second communication devise is a base station (102). Knutson discloses in figure 1 a base station with a plurality of wireless terminals.

16. In regards to claim 43, Knutson, Dagdeviren, and Kim disclose the method of claim 40, further comprising: adjusting the symbol timing of a receiver included in said first communications device to delay said receiver symbol timing by said D samples; and wherein the step of adjusting the symbol timing of said transmitter in said first communications device includes delaying the transmission of symbols by D samples by modifying the selected symbol by adding D samples to said selected symbol thereby increasing the duration of the selected symbol. Knutson discloses adjusting by D samples in column 8 lines 1-6.

17. In regards to claim 44, Knutson, Dagdeviren, and Kim disclose the method of claim 43, wherein symbols in said dwell other than said selected symbols are not changed as part of adjusting the symbol timing of said transmitter. Dagdeviren discloses the presence of the cyclic extension in the first and last symbols only in figure 7. Therefore the intervening symbols of the dwell cannot be affected because only the cyclic extension is modified in order to delay or advance the dwell.

18. In regards to claim 45, Knutson, Dagdeviren, and Kim disclose the method of claim 43, wherein the first symbol in said dwell is selected as said selected symbol, the selected symbol having N samples, the step of modifying the selected symbol by adding D samples including:

copying D samples from a body of said first symbol and inserting the D copied samples at the start of said selected symbol to produce a modified first symbol having N+D samples.

Dagdeviren figures 9 and 10 disclose adding length copied from the body into the cyclic extension. The length can be added either to the first symbol or the last symbol of the dwell. The modified symbol will inherently have a length equal to the original length plus the length newly added.

19. In regards to claim 46, Knutson, Dagdeviren, and Kim disclose the method of claim 43, wherein the last symbol in said dwell is selected as said selected symbol, the selected symbol having N samples, the step of adjusting the symbol timing further including: copying D samples from a body of said selected symbol and inserting the D copied samples at the end of said selected symbol to produce a modified last symbol having N+D samples. Dagdeviren figures 9 and 10 disclose adding length copied from the body into the cyclic extension. The length can be added either to the first symbol or the last symbol of the dwell. The modified symbol will inherently have a length equal to the original length plus the length newly added.

20. Claims 47-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knutson et al. (US 6,563,862) in view of Dagdeviren et al. (EP 0 933 897) further in view of Kim et al. (US 7,110,387) further in view of Spruyt et al. (EP 0 820 171).

21. In regards to claim 47, Knutson, Dagdeviren, and Kim disclose the method of claim 40, but not wherein the step of adjusting the symbol timing of said transmitter in said wireless terminal includes: adjusting the symbol timing of said transmitter included in said first communications device to advance the transmission of symbols.

Spruyt discloses in column 2 lines 28-31 that the adjustment is done by deleting symbols.

It would have been obvious to one of ordinary skill in the art at the time of the invention to align the symbols of Knutson and Dagdeviren's system by either deleting symbols as taught by Spruyt because doing so aligns the boundaries of received and transmitted symbols, as taught by Spruyt in column 2 lines 28-31 and reduces the complexity of echo cancellation, as taught in column 2 lines 18-19. 36.

22. Claims 48-50 are rejected upon the same grounds as claims 28-31 respectively.

23. Claim 51 is a combination of the limitations of claims 21, 32, and 37 and is therefore rejected upon the same basis.

24. Claim 52 is rejected upon the same basis as claim 32.

25. In regards to claim 53, Knutson, Dagdeviren, Kim, and Spruyt disclose the mobile communications device of claim 52, wherein said symbols are frequency division multiplexed symbols, the mobile communication device further comprising: an antenna for transmitting symbols including a symbol whose duration has been changed by one of said copy circuitry and said deleting circuitry. Knutson discloses an antenna for transmitting symbols, including those with duration changes in figure 1 element 121.

26. Claims 42, 54, and 61-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knutson et al. (US 6,563,862) in view of Dagdeviren et al. (EP 0 933 897) further in view of Kim et al. (US 7,110,387) further in view of Spruyt et al. (EP 0 820 171) further in view of known prior art.

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27. Claims 54 and 42 include limitations where the mobile device is in communication with two separate base stations at the same time. The mobile device is able to independently adjust each signal in order to correct the timing individually for each base station. Knutson, Dagdevrin, and Spruyt disclose methods for adjusting the timing when in communication with one base station, but not in communication with two base stations.

It is common and well-known that mobile devices will be in contact with two base stations during handover.

Official Notice is taken that it therefore would have been obvious to one of ordinary skill in the art at the time of the invention to modify the timing adjustment method and device of Knutson, Dagdeviren, Kim, and Spruyt in order to adjust two individual signals from different base stations in order to maintain a call during handover.

28. Claims 61-63 and 64-66 are rejected upon the same grounds as claims 37-39 respectively. However, each of the prior art references discloses only hardware systems. They do not include a processor which uses a memory device storing instructions to implement the method.

It is known in the art to use a processor in conjunction with a memory device storing instructions. Software implementations can be faster, cheaper, and easier to integrate into existing infrastructure. Additionally administrators who are already familiar with similar software applications may find it easier to manage a software implementation.

Official Notice is taken that it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the symbol timing adjustment taught by Dagdeviren, Spruyt, and Kim in software, as is known in the art, because software may be the best option when evaluated in terms of speed, money, and ease of administration.

29. Claims 55-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dagdeviren et al. (EP 0 933 897) in view of Spruyt et al. (EP 0 820 171) further in view of Kim et al. (US 7,110,387) further in view of known prior art.

30. Claims 55-57 and 58-60 are rejected upon the same grounds as claims 26-28 respectively. However, each of the prior art references discloses only hardware systems. They do not include a processor which uses a memory device storing instructions to implement the method.

It is known in the art to use a processor in conjunction with a memory device storing instructions. Software implementations can be faster, cheaper, and easier to integrate into existing infrastructure. Additionally administrators who are already familiar with similar software applications may find it easier to manage a software implementation.

Official Notice is taken that it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the symbol timing adjustment taught by Dagdeviren, Spruyt, and Kim in software, as is known in the art, because software may be the best option when evaluated in terms of speed, money, and ease of administration.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KERRI M. ROSE whose telephone number is (571) 272-0542. The examiner can normally be reached on Monday through Thursday, 7:00 am - 4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Aung MOE can be reached on (571) 272-7314. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aung S. Moe/
Supervisory Patent Examiner, Art Unit 2616

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Examiner, Art Unit 2616